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ABSTRACT

A descriptive study outlined the approaches used in the assessment of student performance in technical/practical subjects (e.g., agriculture, home economics, and woodworking) in Zimbabwe secondary schools. Eight schools participated in the study. Data on techniques used to evaluate student performance were collected by questionnaires received from 31 teachers of technical/practical subjects (an 82 percent response). The questionnaires consisted of demographic information, 17 Likert-type questions, and three open-ended questions. Most of the respondents were involved in grading national examinations or attending standardization courses. In addition, interviews were conducted with heads of the participating secondary schools and with the education officers of the chosen region. The study found that students' performance was assessed through final examinations, course work, and a combination of the two. Problems related to reliability were found in the present use of coursework marks. The advantage of the combined approach was found to be that one method checked upon the other, but teachers and heads of schools were not in agreement as to whether they preferred examinations or course work as methods of assessment. They thought that it would be reasonable to count the examination as 60 percent of a pupil's grade and the course work as 40 percent. (A 29-item bibliography, the questionnaire, the interview schedule, and data from the questionnaire presented in tabular form conclude the document.) (Author/CML)

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Assessment of pupils' practical work in technical/practical subjects in secondary schools

N. Nelson Chinyamunzore

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ASSESSMENT OF PUPILS' PRACTICAL WORK IN TECHNICAL/PRACTICAL SUBJECTS IN SECONDARY SCHOOLS IN ZIMBABWE

N. Nelson Chinyamunzore

DISSERTATION
submitted as partial fulfilment for an
MA DEGREE IN BUILDING EDUCATION

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Department of Education and Psychology
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The study was about the approaches and techniques used in the assessment of pupils' practical work in technical/practical subjects secondary schools. The relationship in the assessment approaches and techniques used in the secondary schools and national examination and finding out problems of assessment were the object of the study.

The study was done in Zimbabwe. Education officers and schoolheads were interviewed, technical/practical subject teachers responded to a questionnaire. Documents were also reviewed.

The findings of the study indicate that schools tend to adopt the same methods of assessment used by the examination. The findings of the study also showed that there were problems related to reliability of the present use of coursework marks. The report ends with a discussion on an alternative approach that can solve the problem. It is hoped that the knowledge from the study would help in the discussions and decisions on assessment in Zimbabwe.

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FOREWORD

This Master of Arts dissertation was prepared within the framework of a bilateral cooperation project between Sweden and Zimbabwe. The Swedish International Development Authority - SIDA - provided financial support for the project.

Linköping University has been responsible for the education in cooperation with the University of Gothenburg. Fifteen students participated in the programme. Three students completed the main part of their education at University of Gothenburg. Twelve students completed their education at Linköping University.

For the twelve Linköping University students, the Department of Crafts and Design held the major responsibility for the courses. The exceptions being the course in research methodology and the actual preparation of the dissertations where the Department of Education and Psychology was responsible. Facilities for the fieldwork were provided by the University of Zimbabwe.

The Department of Crafts and Design has been the host department and responsible for the administration and coordination of the programme.

Linköping May 16, 1989

Bengt Wetterstrand
Head of Department
Dept of Crafts and Design

Lars Owe Dahlgren
Professor and Examiner
Dept of Education and Psychology

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My gratitudes go to the Chairman, Dr. Nyagura, and staff of the Department of Curriculum Studies in the Faculty of Education of the University of Zimbabwe for their assistance in the arrangements for data collection. I also want to thank my brother, Kuzi Rodrick, for travelling with me during the collection of data. I will not forget to give many thanks to those Education Officers, schoolheads and teachers who responded to my research instruments. Without their participation the research would have been impossible.

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Nakai Nelson Chinyamunzore
May, 1989

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PREFACE

Assessment of non-academic education has often been dominated by the assessment approaches and techniques used for academic subjects. This created problems until people interested in non-academic education began to question the validity of this.

One useful way suggested by Tylor, Bloom, Baldwin and others was the breaking down of the subject content and creation of assessment objectives that could be more easily handled and measured.

Most materials about assessment have been oriented towards the first world. Little has been done for non-academic education in the developing countries with their socioeconomic limitations.

Interest in technical education and direct involvement with national examinations has influenced the author to look into assessment of practical work in technical subjects. The enquiry was not witch hunting but an attempt to ascertain, to describe and to understand problems in the assessment of practical work in secondary schools and examinations in Zimbabwe.

Nakai Nelson Chinyamunzore
May, 1989

INTRODUCTION

Technical education has been seen as the vehicle to solve economic and social problems, that is, problems of underdevelopment (Krieger, 1988; Lauglo & Lillis, 1988; Mackenzie, 1988). The drive to emphasise science and technical education received a major thrust when the Sputink shocked the Americans into realising their backwardness in science and technology. Ever since then, many countries have followed the example of developing their education with a slant towards science and technology.

Zimbabwe was caught up in this drive. In retrospect it can be seen that Zimbabwe had an education system with a predominantly academic emphasis; a colonial inheritance. It was mainly for the 'whites' and little of the (politically designed) technical/practical education was for the 'blacks' (Rose, 1970; Chikombah, 1988). Similar cases elsewhere in Africa have been reported in the Phelps-Stroke's report in Krieger (1988).

With Zimbabwean Independence in 1980 came a movement to even out the differences in education and change the emphasis. One major change was the large expansion in pupil intakes both at primary and secondary school levels which resulted in the necessary massive reconstruction of these schools and an expansion of teacher training for both (Chikombah, 1988; Mackenzie, 1988). Table 1 shows the enrolment statistics.

Table 1. 1979-1986 enrolment statistics of primary, secondary school and teacher colleges (Table adapted from Mackenzie, 1988, p. 339 and from Chikombah, 1988, p. 12)

Year	Primary	Secondary	TT Colleges
1979	819,586	66,215	2,249
1980	1,235,994	74,321	2,829
1981	1,715,169	145,801	3,610
1982	1,934,614	224,609	4,873
1983	2,046,123	316,438	-----
1984	2,214,798	422,584	-----
1985	2,229,396	497,766	17,000
1986	2,260,367	545,841	-----
Increase	205%	538%	656%

There were support programmes such as schools receiving technical subjects kits from government. Schools were encouraged to start up or introduce technical or/and practical subjects. Agricultural, technical and polytechnical colleges were constructed in increasing numbers. All this clearly illustrates the magnitude of the effort to direct education towards science and technology.

In 1982 for the first time in Zimbabwe, technical/practical subjects in all schools had national examinations at junior certificate level. The pre-independence F2 secondary school had technical/practical biased education specially designed for the 35,5% of the blacks grade 7 graduates. The other 12.5% black grade 7 graduates went for the F1, where they took 'O' levels. The remaining 50% had to find their own way in education and work. The few schools that offered technical/practical subjects at 'O' Levels had examinations. F1 was a symbol for academic oriented secondary schools and F2 for nonacademic oriented secondary schools.
Other changes are the move towards the localisation of the national examinations, that is, the complete break-away from the Cambridge examinations. In the pipeline are technical subjects at 'A' Level. Already the Bachelor of Education degree in technical education at the University of Zimbabwe is helping to train some of the teachers.

Such massive expansion in technical education brings with it many curricula problems, such as, those concerning content, extent, instruction and evaluation. Evaluation in these large numbers of schools and other institutions of higher education with these large pupil/student intakes do present difficulties.

The large administrative and teaching force with various qualifications and experiences is a related problem. Lack of skilled personnel and finance are common problems in expansion programmes. It was with these problems in mind that the author decided to investigate the assessment approaches used in technical/practical subjects in Zimbabwean secondary schools.

Assessment in education can be looked at in two ways. One is the assessment of the sum total of the whole education to see if goals, aims and objectives have been met or not. The other assessment is of the individual. This will indicate the effectiveness of a teaching and learning situation and will grade the candidates as selection for college and university entrance and for job/vocational training.

In Zimbabwe technical/practical subjects have been assessed as:

1. theory and
2. practical skills.

This dissertation deals with practical skills only and these have been studied as:

1. final practical examinations
2. coursework tasks

The objectives of this study then are:

- to identify the approaches and techniques of assessment used by teachers in examinations of pupils' practical work in technical/practical subjects in secondary schools.
- to establish the relationship between assessment in examination and assessment of pupils' practical work in school.
- to define problems, if any, and suggest possible solutions.

1. THEORETICAL FOUNDATION

1.1 Definition of main concepts

School subjects, in many educational settings, are usually divided into two main categories, "academic" subjects, and the "non-academic" subjects. Academic subjects include *theoretical* subjects like the arts and sciences, non-academic are *practical* subjects like engineering and technological subjects. Borderline cases are in the sciences and some arts subjects. One can not divorce engineering and technology from sciences in a subject like geography for example.

Figure 1 illustrates the subject classification in 'the Zimbabwe education system.

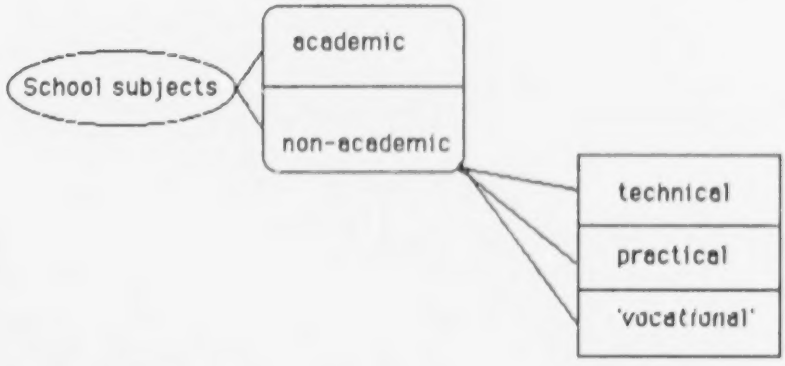

Figure 1. Subject classification in education

Technical, Practical, Vocational:

Perhaps a look at the key words will help to clarify some terms and prevent misconceptions. The term "technical" is diverse and used in different senses in different countries (Lillis, 1982). The subjects may be called technical subjects, industrial subjects, industrial art subjects, vocational or practical subjects. The Oxford Advanced Learner's Dictionary of Current English, (1987, p. 887) explained *technical* as "connected with, the execution of work of art ... connected with a particular art, craft, science, etc." and art, as; "the creation or expression of what is beautiful ... drawing, architecture, music, etc." (page, 43).

So technical subjects are studies or courses that deal with works of art, craft and science and with the creation of artefacts and objects. These subjects usually

have both theory and workshop practice. The *theory* is the scientific, mathematical and artistic concepts, that is, such knowledge that belongs to the cognitive and affective domain in the taxonomies of learning. (Bloom et al 1971). The *practical* is the skills, craft, art or trade-skills training, the actual handling of materials and equipment (Kempa, 1986). This belongs to the psychomotor domain as classified by Bloom et al (1971).

In Zimbabwe, the term "technical" refers to such subjects as Woodwork, Metalwork, Technical Graphics (formerly Technical Drawing) and Building. These subjects have a strong engineering and technological component. Engineering is the main body of knowledge that derives strongly from applied sciences and mathematics. Subjects like Home Economics and Agriculture are classified as "practical" subjects and this classification is evident in the Zimbabwe Ministry of Education documents. The subjects were classified in this way because they have both practical and theoretical components. The main reason for the use of the term *practical* was that these subjects do not have a strong engineering or technological but scientific component.

Kempa (1986) puts "science" as a "practical" since the pupils physically manipulate three-dimensional objects and materials. Kempa, (1986, p. 68) says "... sciences have an empirical basis and they involve practical pursuits and activities." In Sri Lanka, Diyasena (1976) termed all of the technical/practical subjects as "practical". The definitions of the so-called technical/practical subjects are vague and notoriously ambiguous and heterogeneous.

Other terms used are "industrial" and "industrial arts". Both these words are common in American literature but the Americans do not agree on the meaning of them (Lauglo & Lillis, 1988; Baldwin, 1971). The common factor is that they have both theoretical and practical components. The term "vocational" tends to put both technical and practical subjects together in the sense described by Bacchus (1988) who defined vocationalisation as,

> ... efforts by schools to include in the curriculum these "practical" subjects which are likely to generate among the students some basic knowledge, skills and dispositions that might prepare them to think of becoming skilled workers or to enter other manual occupations. This inclusion of practical or industrial arts subjects in the curriculum ... (Bacchus 1988, p. 31)

These distinctions do not help much. As long as the subjects have a theory and a practical aspect, then they are of interest. The Zimbabwean way of defining the subjects would be used.

Evaluation, Assessment:

It is again important to look at the words; evaluation and assessment. The Oxford Advanced Learner's Dictionary of Current English, (1987, p. 292) describes *evaluation* as, "find out, decide the amount or value of." George

(1981, p. 3) says evaluation is "the effort to judge the extent and efficiency of accomplishment and to find ways of improving". Bloom et al (1971) define evaluation thus;

> Evaluation, as we see it, is the systematic collection of evidence to determine whether in fact certain changes are taking place in the learners as well as to determine the amount or degree of change in individual students.
> (Bloom et al 1971, p. 8)

In this report the author is interested in the ways of evaluation of pupils' outcomes in practical work in technical/practical subjects in an attempt to come up with workable means of assessment. *Assessment* has been defined, in the Oxford Advanced Learner's Dictionary of Current English (1987, p. 46) as, to "decide or fix the amount ... appraise, fix, decide the value". The word is close to evaluation. Perhaps the word "appraise" might enlighten the discussion. Assessment in education may be looked at as the sum total of the whole process of appraisal of the student's work, that is, all the aspects evaluated. Salvia and Ysseldyke (1978) give a comprehensive description of assessment.

> Assessment is the process of understanding the performance of the students... Assessment is always an evaluative, interpretative appraisal of performance.
> (Salvia and Ysseldyke 1978, p. 4)

1.2 Assessment in education

Assessment in education is a multifaceted process that involves far more than just the giving of tests and examinations. When students are assessed, consideration is given to the way they perform a variety of tasks in a variety of settings or contexts. The total performances of the individual, and the likely explanations for this performance is considered.

Assessment is found throughout the educational system and it is an integral part of education. The purpose of assessment is predominantly educational, that is, to test the students' abilities. This is done in order to evaluate the students' academic progress and learning difficulties. The evaluation of the effectiveness of the curriculum is also part of assessment in education (Kempa, 1986; Salvia & Ysseldyke, 1978). Assessment carried out by the schools' "internal" examinations mostly have an educational function. National or "external" examination have educational function too but emphasise selection for higher education or employment.

National examinations in education are also used to define the content and orientation of the curriculum. These are usually societal demands, for example, from the public and professional boards (Kempa, 1986). Mathews (1965 in Kempa 1986, p. 8) observes the pressure examinations exert upon the schools and teachers. This he finds dependent on the "social and educational climate of

the country and on the degree to which examination results are used for the selection procedures". Zimbabwe is said to have a strong demand for "certification", the so-called "diploma disease" (Mackenzie, 1988).

1.3 Assessment in technical/practical subjects

The assessment and evaluation of pupils' work in the technical/practical subjects has been divided into two categories. This has followed the analysis of the learning domains; the *cognitive* , that is, the theory aspects and the *application*, that is, the practical component. The assessment of the cognitive or theoretical part in the technical/practical subjects followed the approaches and techniques of assessment used in conventional subjects like natural sciences. The analysis and formulation of assessment objectives are much the same. Studies show that objectivity, reliability and validity can be checked to a great extent (Kempa, 1986; Salvia et al 1978). The assessment approaches and techniques of the theoretical aspects of technical/practical subjects are outside the boundaries of this report.

Assessment of the practical or psychomotor part of the subjects has varied. Scientific approaches have been designed to aid the evaluation and rating of pupils' work. The task analysis and the assessment objectives in the taxonomies of learning have been used extensively. For example, pupils' work have been assessed as (i) knowledge (ii) understanding and interpretation and (iii) application, that is, the manipulative skills (Bloom et al, 1971; Baldwin, 1971; Kerr, 1964). Knowledge is the cognitive preparation of the student in the type of skills required of him. Understanding is the organisation of the knowledge or cognitive abilities which include perceptual theory. The theory deal with how the student perceives the task with intrinsic or/and extrinsic motivation. This helps the rationalisation of the concepts in an attempt to overcome the problem. Finally application is the motor skills to work the materials, tools, equipment or machinery to produce the artefact or object required.

The exact use of the taxonomies varies greatly from one subject to another. But the layout is generally the same, that is, the breaking down of skills to measurable and assessible components. An example of the breakdown of assessible abilities in practical work are shown in Table 2.

Table 2. Breakdown of assessible skills in the (practical) psychomotor abilities. (Table compiled from Kempa, 1986, p. 70)

Skills to be assessed	General qualities for assessment
(a) Recognition and formulation problem.	Identification of variables to be studied and controlled.
(b) Designing and planning of working procedure	Choice of working conditions, including choice of tools and equipment. Procedure and technique of measuring, sequencing of varying variables and operations etc.
(c) Setting up and execution of work (manipulative skills)	Methodical working, correctness and safety of working technique, manual dexterity in the execution of practical work, orderliness and organisation.
(d) Observational and measuring skills	Accuracy and precision in the conduct of measurements and reliability of observation.
(e) Interpretation and evaluation of work and observations	Tenability of conclusions and inferences drawn from work data and their relevance to the problem in question. Evaluation of limitations and potential error sources associated with the working procedure.

1.4 Different approaches to assessing practical work

Usually the assessment of students' work is done in three ways. One is as end-of-year or course terminal examination, outcome based assessment. This assessment based on the evaluation of students' performance on tasks or assignments that are specially designed for the purpose of assessment is sometimes called summative evaluation. Thus this approach in assessment generally establishes the students' terminal achievements. The usual technique is, end-of-year or course one-off practical examinations or tests (Kempa, 1986).

In Kenya, Sri Lanka and many other countries practical work in technical subjects is assessed in a final examination of a number of hours where a piece of work is marked and graded (Enquist et al, 1982). This summative approach to assessment has been critised, it may take no proper account of good students' work done during the course itself.It assumes that the end product is the only way to assess the pupil and that the processes are insignificant. This is particularly interesting when practical work is involved. Examination conditions account for some of the reasons for failures.Variables such as time and space, tools and materials may upset the student in the decisive examination (Cumming et al, 1985). Can a reasonable sample of skills involved in, say, designing and production, be tested in four hours?

The second approach is that the student is assessed continuously over the entire course, process-based assessment. Here assessment is based on an evaluation of students' performance on tasks or assignments that are primarily planned as an integral part of a learning experience. This is sometimes called formative evaluation. The essence of this approach is that the students' work is assessed over a period of time, giving room for the student to improve. At the same time the teacher will adjust his/her instruction to remedy the teaching and learning experiences. In this approach, graded tasks are usually given and the scores are counted together to make an assessment. The usual techniques are problem solving tasks and project work or investigations undertaken individually or in groups.

Pre-vocational education in Sri Lanka has adopted this type coupled with the student's own assessment of his own work and the coursework mark compiled by the teacher (Diyasena, 1976). The same idea is being developed in the General Certificate of Secondary Education (GCSE) examinations of art and craft design and technology in United Kingdom (Genin, 1988; Kempa, 1986). Baldwin (1971) suggests that trade skills be evaluated on the basis of short performance tests (formative evaluation). This, he argues, will give the student a fairer measure of his skills.

The third approach is a combination of the first and the second approaches mentioned above. The combination may not necessarily be 50-50%. What determines the distribution is the use to which the examination results obtained are put . The pros and cons of reliability of the techniques will be discussed later.

The idea of assessment in technical/practical subjects is represented by the diagram, figure 2.

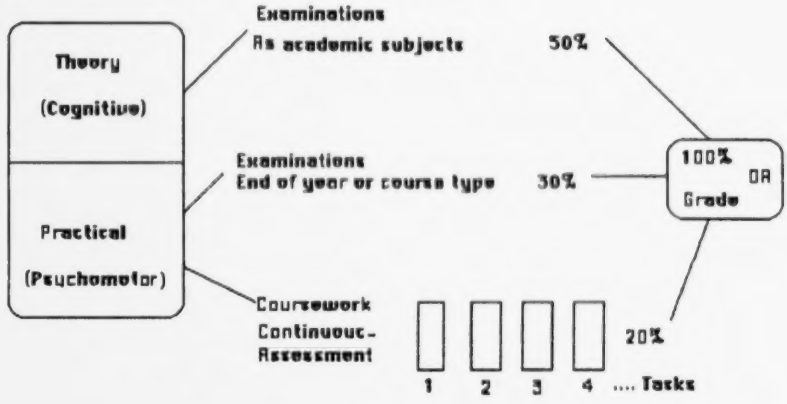

Figure 2. Layout of assessment approaches and techniques in technical subjects

1.5 Assessment techniques of practical work

Problems of assessment of practical work in schools is mainly attributed to objectivity and reliability. The techniques of measurement in awarding grades or marks to content dealing with concepts like "feel" "smell" etc, (and attitudes too) are very difficult. Such assessment objectives of the manipulative skills as 'competence with tools' are marked subjectively. The assessment of non-cognitive abilities requires cautious planning of possible objectives and experiences. Table 3 illustrates an example of the breakdown analysis of assessment of manipulative skills.

Table 3. Analysis of manipulative skills.(adapted from Kempa,1986, p.71)

Skill competence	Performance feature
Methodical working	Correct sequencing of task forming part of an overall operation Effective and purposeful utilisation of equipment. Effective use of working time Ability to develop an acceptable working procedures with limited instruction and resource.
Working technique	Correct handling of tools, equipment and materials. Safe execution of working procedure and taking of adequate precaution to ensure reliable observations and results.
Manual dexterity	Swift and confident manner of execution of practical tasks Successful completion of an operation or part-tasks.
Orderliness	Good utilisation of available working space. Organisation in the placing of tools, equipment and materials used and tidiness of working area.

Holistic assessment approaches have been suggested as fair and more meaningful measure of the practical work. The condition is that the procedure be easy to administer and allow the students' grade to be determined with a high degree of reliability.

Heywood, (1977) suggested profiles. A profile is a breakdown of all the skills and abilities that need to be assessed and a grid of scores. The profile should cover the entire learning situation including attitude assessment. Profiles can be used in the context of coursework. Professor D. Hinton of the Birmingham School of Architecture (Heywood, 1977) developed profiles of the performances of graduates in architecture. The student at the end of the course received the profile plus the course grade. This he said, would give the prospective employer a performance layout (testimonial) of the student. The City and Guilds of London Institute uses the profile approach in its Vocational Preparation (General) programme.

The continuous assessment or coursework technique can be done in two ways. In one, all the student does in the course is appraised, in the other, some specific tasks are to be assessed during the course. The main advantage of this system is that good students who may fail in the final examinations due to stress or some other variable will have their coursework assessment as a counter-weight. Continuous assessment evaluates the student in a more realistic everyday situation. Weaknesses in the students' or the teaching can be diagnosed and remedied. Examination stresses are reduced. The spread of marks given over coursework tasks compensate for the error inherent in the mark awarded in a single and final examination (Heywood, 1977).

One problem with continuous assessment is that the teacher with the overall responsibility of the students may become very authoritative. A second problem is that students tend to concentrate only on what is counted for assessment. Another problem is that the teacher may develop permanent attitudes about a students' aptitude (the labelling theory) mark up to the labelled mark (the self-fulfilling prophecy theory) (Karabel, Halsey 1977; Bloom at al.1971). It is also open to all sorts of abuse.This will greatly reduce reliability of course. Close monitoring is essential and this makes it labour intensive and expensive.

The use of one-off examinations in the assessment of practical work has been discussed. This practice is still used. The approach is cheaper and requires less manpower. Only one object is required for assessment and a few markers evaluate. The main criticism is that only a very limited range of the many skills are evaluated. The results of the examination do not reflect the total students' abilities or potentials.

The use of combined approaches in assessment of practical work has been increasing. Studies carried out to check the use of the combined approaches show that the methods outcome-based and process based-assessment have some correlation (Heywood, 1977; Kempa, 1986). Continuous assessment is said to be an indicator of the students' true ability. Coursework marks has been used to moderate final examinations. However, the combined approach has problems related to students' motivation, under-working of the students if the course-work-examination distribution is 50-50%. Therefore, careful consideration must be given in the combination and use of the approaches.

1.6 Assessment of practical work and reliability

In technical/practical subjects *practical* work is usually assessed as close to coursework assessment as possible. The techniques used are practical, projects, fieldwork, etc. *Theory* is assessed as close to conventional written end-of-year examination as possible and the usual techniques are; essays, objective tests, multiple-choice tests, oral examinations, etc.

The diagram, figure 3, represents the idea of assessment in technical/practical subjects

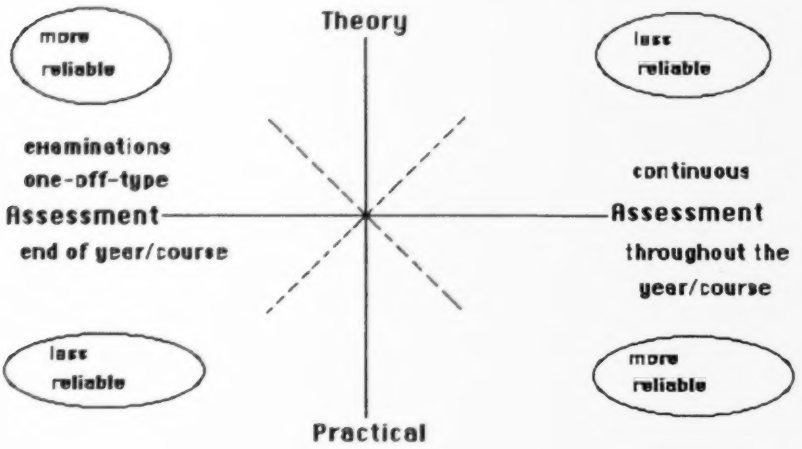

Figure 3. Assessment reliability distribution in technical/practical subjects

The figure shows that the evaluation of theory in technical/practical subjects in one-off examinations can be very reliable but the reliability is very weak when coursework is used. Reliability has to do with:

1. adequacy of the work sample
2. control of the examination or test work environment
3. well-defined examination or test criteria
4. trained examiners or testers etc.

When practical work is assessed as a one-off examination, reliability is greatly affected by factors already mentioned. Reliability is strong when pupils' outcomes are assessed as continuous assessment. In this case examinations can be eliminated. The main disadvantage is that continuous assessment requires constant and random monitoring of the assessment to control the approach. The concepts discussed above can be presented in a diagram as shown in figure 4.

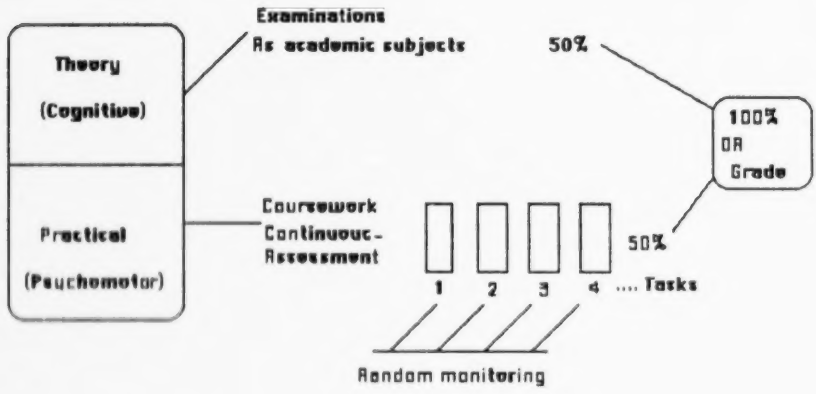

Figure 4. Alternative approach to assessment in technical/practical subjects

The question of whether practical skills should be assessed as one-off examination or as continuous assessment is dependent on historical and economic factors of the education system, societal and educational demands on examinations and results.

2. METHODOLOGY

2.1 Design of the study

The study approach can be described as descriptive. It attempts to outline the approaches used in assessment of technical/practical subjects in secondary schools.The technique adopted was derived from the research objectives and thus reflects the type of knowledge to be obtained, that is, to describe, explain and understand the phenomena in the frame of the perspective chosen.This approach falls under "traditional" applied research in the social sciences. Such a perspective means that the research methods and techniques cannot be rigidly applied but have to be more flexible so as to utilize a wide range of methods to answer the question (Burgess, 1984; Selltiz, et al, 1959). Wax (1971) puts it like this:

> Strict and rigid adherence to any method, technique or doctrinaire position may, for the *researcher*, become like confinement in a cage. If he is lucky or very cautious, a *researcher* may formulate a research problem so that he will answer the needs within the cage. But if he finds himself in a field situation where he is limited by a particular method, theory, or technique he will do well to slip through the bars and try and to find out what is really going on. (Italics added).
> (Wax, 1971, p. 10)

Most studies in education are aimed at the building up of knowledge and to provide the decision makers with knowledge on which to base their decisions.The design, of course, confers with the purpose, arrangement of the condition for collection and the analysis of data. A strict survey could have been the best and could have produced more relevant and generalisable results."Survey studies appear *deceptively* easy to carry out ..." (Italics added) (Erasmie, 1980, p. 19). Surveys usually have rigorous sampling methods and have other serious rubrics so that the findings can be generalisable to the whole population. However, Shulman (1981) and others believe that most studies have a "degree" of generalisability.The survey technique will be used not in its strict sense.The research purpose and the economy contributed to the choice of the design.

This study was designed to get an inside picture, identify and highlight some of the approaches and problems in assessment of pupil's practical work in technical/practical subjects in Zimbabwe secondary schools. It is hoped the findings will help future development of assessment of practical work in technical/practical subjects and the building of knowledge on assessment in education in Zimbabwe.

2.2 The subjects

Since the study would be descriptive and the finding relatively generalisable, the choice of the subjects in this study very much depended on the research design and how the data would be collected. The other reason for the choice of the subjects was that they were within easy reach given the resources and the time of the year.

"Although a random sample may not be of value .... it is nevertheless important to select respondents so as to ensure a representation of different types of experiences" (Sellitz et al 1959, p, 56). The author selected 8 schools that ranged from old established schools to schools that started after Independence the so called "Upper Tops" This was an attempt to vary the calibre of the schools in the sample. Had the schools been scattered it would have been almost impossible to cover them all and get a good respondent percentage this, busier time of the year for the schools, the pupils, teachers and administration.

2.3 Data collection techniques

To achieve the objectives of the study, questionnaires and interviews were used. Documents were also reviewed. Questionnaires and interviews are the most commonly used research instruments in surveys and other research designs. "The researcher will choose one or more techniques which he considers to be the optimum for the answering of the research question" (Patel,1988). Interviews, questionnaires and document review were the techniques found possible and adjustable in the collection of the data.

2.3.1 The questionnaire

The personally administered questionnaire was found suitable since it would have been difficult for the researcher to visit and interview all the subjects in the sample. Limited economic resources were the main reason. The subject teachers were scattered and it would have taken a lot time. The questionnaire has the advantage that it can be used to cover a large number of subjects. It also has the advantage of giving time to the subjects to think over the answers.

The questionnaires were administered to secondary schools technical/practical subjects teachers in the schools chosen. The structure was that it started with background information, that is, name of the respondent, the school, etc, followed by seventeen items of the Likert type and then three open ended questions. (See appendix A).The information identify assessment approaches and techniques used in the evaluation of pupils' practical work in secondary schools and the examinations.

The instructions to the respondents were to tick or underline the chosen alternatives and fill in the spaces provided. The instrument was administered personally by the author which meant travelling from school to school. On completion the respondents handed over the questionnaires or sent them on if the respondents were unable to complete the questionnaires in time. Most of the respondents were people involved with the marking of national examinations or attending examinations standardisation courses. Stamped and addressed envelopes were provided. All five stamped and addressed envelopes were not returned. The returns are shown below (table 4) including the returns percentages.

Table 4. Questionnaires sent out and the returns

	Number possible	Number returned	Returns as %
Questionnaires	38	31	82%

2.3.2 The interviews

The interview was administered to the secondary schools heads and to the Education Officers of the chosen region. The main advantage of the interview technique is that the interviewer has the flexibility to pursue a point or elaborate and re-defines a response if it appears incomplete and ambiguous (Wiersma, 1969). Schoolheads and Education Officers are usually very busy people to respond to questionnaires that is why the interview technique was found to be appropriate for the purpose.

An interview schedule was prepared with ten open-ended questions. (See appendix B) The information obtained would help explain the relationship of assessment in schools to examinations.The same schedule was used for school heads and Education Officers. The author made appointments with the respondents and asked them questions from the schedule. The author asked the questions and discussed the answers and recorded responses immediately after the interview. Table 5 illustrates the possible numbers, the number interviewed and the percentages.

Table 5. Interviews possible and those done

	Number possible	No. interviewed	Returns as %
Interviews	13	8	62%

Three schoolheads were not available for the interviews, they were busy with other school duties.Two Education Officers not interviewed were involved with the examinations and the author could not locate them.

2.4 Procedure

Permission to carry out the research was granted by the Ministries of Education. The department of Curriculum Studies of the Faculty Of Education of the University of Zimbabwe made the request. It also informed the schools and Education departments of the researcher's intended intentions.

The time set aside for the collection of data ranged from 14 November 1988 to 23 December 1988. But the schools calendar in Zimbabwe was crowded at this time. Examinations both 'internal' and 'external' were in progress. Most teachers were marking examinations or attending standardisation courses.

The collection of data started immediately with administering the questionnaires to the schools.The schoolhead was interviewed then if available, or an appointment was made to see the head on another day. By the 17 December only the two Education Officers remained.

The findings were computed using the Macintosh StatView Programme and Cricket graph. Simple statistics will be used to get descriptive data of the research findings. Frequency distribution and the percentages of responses will be presented in tables and graphs.

3. DESCRIPTION AND ANALYSIS OF DATA

This chapter will present the data in the attempt to answer or explain the problem. The questionnaire will be dealt with first, then the interviews and finally the document review.The full data compiled from the questionnaire is found in the appendix C.

3.1 The questionnaire

Background information:

Sixteen males and fifteen female teachers answered the questionnaire. The number of trained against those not trained was also determined; 25 of the 31 teachers in the sample were trained and 6 were untrained. The training was general and not necessarily in technical/practical education. Teaching experiences distribution was from one year to fourteen years. About half of the teachers had one to two years experience. Figure 5 shows the figures.

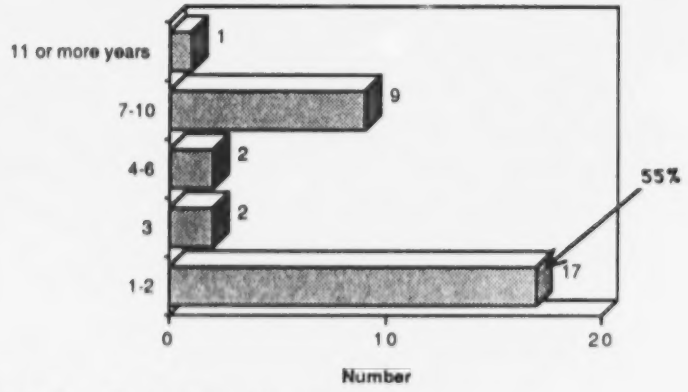

Figure 5. General teaching experience

Teaching experience of the teachers in the teaching of technical/practical subjects was also determined. The large majority had 1 - 4 years experience of teaching technical/practical subjects. Figure 6 illustrates the findings.

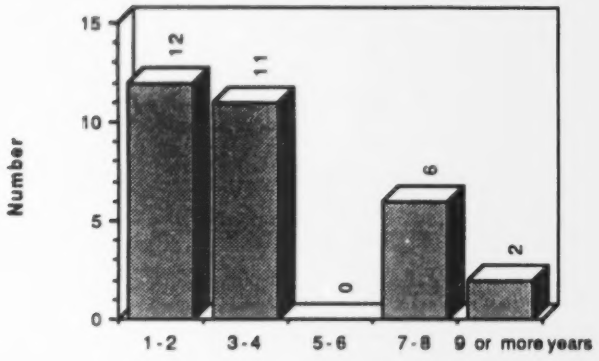

Figure 6. Teaching experience in teaching technical/practical subjects

Thirty six per cent of the respondents were Home Economics teachers. Teachers of Agriculture were 26%, Technical Drawing 16%, and Building with 13% Woodwork 10%. There were no metalwork teachers in the sample, the area chosen did not have many schools offering the subject. Figure 7 illustrates these findings.

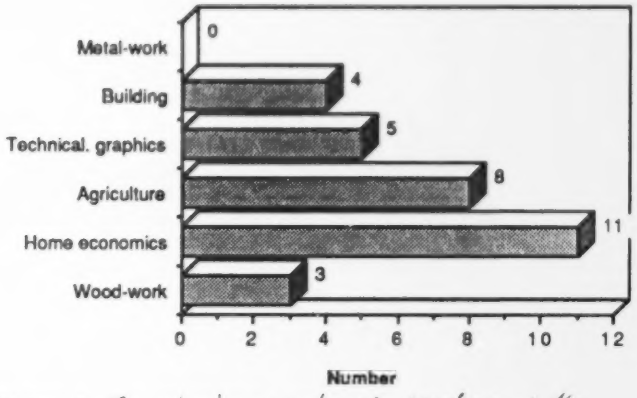

Figure 7. The school subjects the teachers in the sample taught

The class size distribution show that some teachers had class sizes of 15+ students with some teachers with class sizes of up to 45+ students. The most common class size was between 20 and 30. Figure 8 shows the distribution of the class sizes.

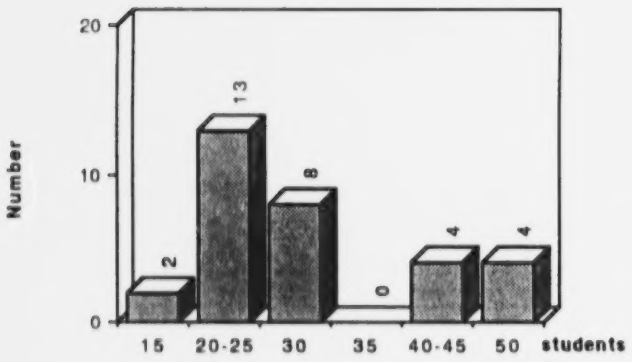

Figure 8. The description of the class sizes

Another variable that was looked at was the teaching load. The teaching load indicated may include other subjects than technical/practical. Twenty two teachers taught 28 - 36 periods per week, seven teachers 20 periods a week, one teacher 15 periods a week and one other teacher had a load of 50 periods a week.

Seventeen teachers said they had some training to mark national examinations. Fourteen said they had not received any training in marking of practical work.

The main part of the questionnaire:

The subjects were asked how often they used marking schemes when marking pupils practical work. Only 1 teacher said he/she did not use the scheme at all, the majority said 'not often' 7 'often' 7 'almost always' and 5 'always'.

Asked if they used the same marking methods as those used in examinations, most teachers said yes. One did not and two indicated that they did not do it often . Figure 9 shows the distribution.

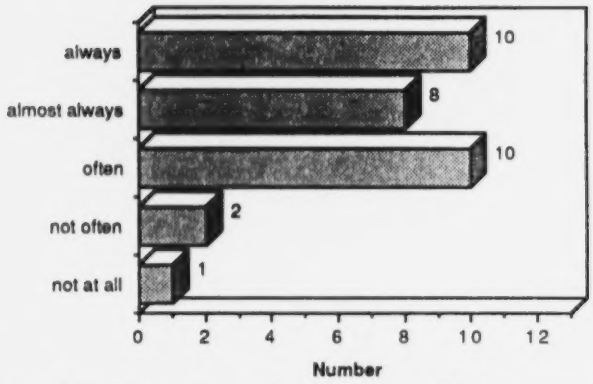

Figure 9. Distribution of marking modelled on examination

Asked if the marking of pupils' work was based on the standard of the best pupil, 14 teachers responded 'often'. 10 teachers 'not often' and 7 'always'.

On whether pupil's work was marked as group or individually, most teachers indicated they marked the work as individual work. If the work was marked by the pupils themselves, the teachers indicated that students mostly exchanged work and did not mark their own.

Eighty per cent recorded pupils' marks as one score. Most teachers used written assessment objectives when marking. The teachers were divided over whether examinations should be one-off and done at the end of the year. 15 agreed and 14 disagreed and 2 were indifferent. The question on whether practical work should be assessed as examination or as coursework, 25 agreed and 4 disagreed and 1 was indifferent.

On the question whether the present means of assessment was adequate or not, 15 thought it was and 12 disagreed and 4 were indifferent.

The question was asked whether internal examinations, that is, mid-year examinations in schools, were modelled on the examinations.Fifty per cent said 'always', 20% said 'often' and 30% said 'not often'. On the examination as one-set piece of work and the mark got used as evaluation at the end of the course, 20 accepted the idea and 10 disagreed and 1 did not answer.

Most teachers indicated that coursework marks always confirm the pupils' aptitude. On whether coursework was done as a mini examination, 13 responded that it was 'always' the case, 11 said 'often' and 6 said 'not often'.

On the coursework mark estimates the majority of the teachers said that they would give values from 30 to 40%. These findings are shown in the table 6.

Table 6. Distribution and percentage estimates for coursework

coursework mark %	count	count as %
10 - 20	4	14
30 - 40	11	38
50 - 60	9	31
70 - 80	5	17
90 - 100	0	0

3.2 The interviews

The schoolheads and education officers interviewed believed that the use of the three papers in assessment in technical subjects had to do with the attempt to cover all the aspects of the subjects. These aspects are:

1. the theory, which is covered by the theory paper in the examination
2. the practical or skills training covered by the coursework tasks and
3. the final end-of-course practical examination.

When asked about how the coursework tasks were done in the schools, most of the heads said they were done as a kind of an examination and the officers said that they should be.

One schoolhead did not believe in the use of coursework marks but relied more on end-of-year type of assessment. The majority of the heads were satisfied with the present means of assessment but commented that something must be done about forgery of marks by some schools. The education officers expressed the same concern and some said the use of coursework marks as part of assessment had to be abandoned. Some thought it should continue but with checks to ensure reliability. The heads and some officers suggested the use of moderators to visit the schools and actually see the projects.

The opinion poll on means of assessment used in other countries gave mixed reactions. Some schoolheads thought the use of pupils' own assessment was a good idea in instructional practice but expressed reservations about it being used as a means of national assessment. The education officers thought it was impossible. Profiles as a means of assessment was also regarded by both the heads and education officers as very difficult and threw much responsibilities on the teachers and the present teacher-pupil ratio, 1:33, was too large for the method they said.

The education officers and the schoolheads said the examinations are fair and give a relatively accurate measure. The education officers said coursework marks had been used to moderate practical examinations. The schoolheads said they were not aware of any new plans for assessment of technical/practical subjects The education officers said the use of coursework marks was to be abandoned in some of the technical/practical subjects at Zimbabwe Junior Certificate. They said coursework method could be reintroduced when the causes of its removal has been corrected they said.

In informal discussions, some education officers said that the 'new' assessment of technical/practical subjects where coursework has been abandoned would be; theory would score 60% and the practical examination 40%. Some of the people thought a lot was needed to be done to the make the assessment approaches and techniques more reliable and objective. This was particularly so now when Zimbabwe is phasing out the Cambridge in favour of a national examination.

3.3 Document review

The education departments visited had documents about coursework marks as a means of assessment, and some technical/practical subjects assessment in general. What was the best means of assessment for Zimbabwean technical/practical subjects? "There is reason to query the way practical tasks are being marked. It appears (coursework) marks are being inflated. The idea of candidates scoring 100% on practical task is unrealistic." (Chimhina, 1988, p 1)

On coursework marks the discussion was centred on the following:

1. lack of standardised condition, that is, the marking and moderation of coursework was not standardised.

2. difficulties in testing real situations, that is, lack of valid objective measurements to test practical skills especially during the learning stages.

3. large number of pupils in a class versus available equipment.

4. cost effectiveness, which included lack of funds to allow random check on coursework tasks carried out in the schools and payment of the teachers marking the coursework.

5. lack of personnel with subject competence to carry out supervision of assessment in the regions.

The recommendations for the Zimbabwe Junior Certificate technical subjects coursework were as follows;

> "In view of a number of factors (unreliability of marks, expense and complexity of moderation procedures) coursework marks should be removed at this time at Zimbabwe Junior Certificate level in Metalwork,Woodwork, and Building ... It may be possible and desirable to re-introduce coursework when the teaching of technical subjects in newly established schools has stabilised and marking skills of teachers have improved." (Report on Vocational Subjects, 1988)

However, the documents went on to state that one way of improving the marking of practical work in secondary schools was the production of booklets for each subject giving recommended tasks, marking schemes and guidelines for markers. Most of the documents called for more research on best means of assessment in technical/practical subjects.

3.4 Analysis and conclusion

The relationship between the background information and the main part of the questionnaire show strong relations in some cases. The variables correlated were, for example, marking training, marking techniques, teacher training and experience and so on. Relation between marking training and modelling of marking of pupils' work on the examinations is shown in table 7.

Table 7. Relation between marking training and marking modelled on examinations.

		r1+r2	r3+r4+r5	
marking training	yes	0	17	17
	no	3	11	14
		3	28	31

r1 = not at all
r2 = not often
r3 = often
r4 = almost always
r5 = always

100% of the teachers trained in marking and 78% of those not trained in marking marked puipils' work modelling on the examinations. The reason may be preperation of the pupils for examinations to get many passes.

Table 8, below shows the relation of teacher training and the use of the best pupil as reference for marking pupils' work in the class. 90% of the trained teachers used the best pupil as reference and the untrained, 50%, chose either.

Table 8. Relation of teacher training and use of best pupil as reference for marking

marking training	r1	r1+r2	
yes	2	17	19
no	6	6	12
	8	23	31

r1 = not often
r2 = often
r3 = always

Methods used in the assessment of pupils' work in technical/practical subjects in Zimbabwe were practical examinations and coursework marks. The schools assessment are influenced by the approaches of assessment used by the examinations. The examinations marked the end product and so the coursework tasks are marked as end products too.

Classes are often too large and teachers sometimes have big teaching loads. The use of continuous assessment as a means of assessing practical work was generally accepted.

The study also identified the problems with the use of coursework marks. The main problem was related to the reliability of the coursework marks presented by the schools. Because of the problems with coursework marks, the authorities decided to abandon the current use of coursework and instead revert to one-off end of course examinations as the only way to assess practical abilities.

4. DISCUSSION

4.1 Summary of the study

The study concerns assessment in technical/practical subjects. The subject content is divided into two, that is, the theory, which is the cognitive and affective domain, and the practical, which is the psychomotor domain. Assessment of theory was not dealt with here. Assessment approaches and evaluation techniques used for practical abilities have been the point of departure.

The investigation identified three approaches used in the assessment of pupils' practical abilities; (1) final examinations, (2) coursework, that is, continuous assessment or teacher-based assessment, (3) a combination.

The main advantage of type 1, final examinations is that the examination is carried out under properly controlled conditions. But where practical abilities are to be measured, examinations tend to be too restrictive, and the time specified too short to cover the many aspects inherent in these subjects. For a 'fair' assessment of most of the abilities need to be included. The approach is mainly summative and gives no room for the teacher to adjust instruction and for the student to improve. But examination are not as labour intensive as the teacher based assessment approach.

The main advantages of type 2, coursework assessment, are that the approach is holistic and flexible. The formative nature of the approach allows the teacher to change or adjust instructions to help the teaching and learning situation. This means the student can improve before the end of the course or programme. Since the evaluation is spread over the course there is a chance to assess many skills. All the assessment is done in a relaxed atmosphere not found in the examination. The major problem is that it is open to abuse.

The combined approach, that is, the use of both type 1 and type 2, does not need to be a fifty-fifty. The distribution is dependent on the climate and the use to which the results are put. The approach has the advantage that one checks the other. In some cases it has been used to moderate examination results.

The study identified the assessment techniques of practical work as coursework or continuous assessment as opposed to one-off-type examinations. Continuous assessment can be profile or by the use of all the work the student does in the course, or by selected tasks designed for assessment. The content, skills/abilities and objectives of the course would be adequately covered in the coursework type of assessment.

Theory has been best assessed by traditional examinations where the content can be adequately covered and where conditions are standard and reliability high.Technical/practical subjects practical work would be assessed by ;

1. coursework which is teacher-based assessment of the practical work
2. theory examination

Figure 4 in Chapter one shows this as a diagram.

The descriptive study aimed to find out what happened in the assessment of practical work in technical/practical subjects. What approaches and techniques are used in the evaluation of pupils' practical abilities in examinations and in schools? The study hoped to establish the relationship between the approaches and techniques used in examinations and those used in schools. The investigation aimed to identify problems, if any, and suggest possible solutions to the assessment and evaluation of pupils' practical work in secondary schools in Zimbabwe.

For the collection of data, the research instruments used were; (1) questionnaires and (2) interviews (3) documents. The subjects of the study were 31 technical/practical subjects teachers in secondary schools. The sample was not random but there were old and new schools. All were conveniencely close so that the researcher could complete the study even at an awkward and busy time for the schools. Over 80% of the total sample returned the questionnaire and over 60% of the Education Officers and schoolheads were interviewed. The collection of data was completed between 14 November and 23 December 1988.

The data was analysed as follows; the questionnaires responses were fed into a computer programme and computed to get quantitative information, such as, the count, frequency distribution and percentages. This information was then presented as tables and graphs. The interviews and documents collected were analysed qualitatively.

The questionnaire showed there was a fairly equal balance of the sexes. This was unexpected - most technical/practical subjects are men. But in this sample there were a large number of Home Economic and there were some female teachers of technical/practical subjects such as Building, Woodwork, Agriculture, etc.

The average class size in the technical/practical subjects in the schools was 30 pupils and the teaching load was an average of 30 periods a week.

The results show that the assessment of practical abilities in technical/practical subjects was done in two ways. The practical work assessment were made up of coursework mark and an examination. Skills assessment in the examination was

done using the marking schemes and teachers in schools used this as a model when doing the "internal" examination. Some teachers, schoolheads and the Education Officers preferred the use of coursework mark and others preferred examinations as a means of assessment of practical work. They thought that a reasonable division for the assessment of practical examination was, 40% for coursework and 60% for the actual examination They suggested that moderators should visit schools to ensure reliable assessment of coursework tasks.

At the moment, the use of coursework is under investigation because it is suspected that some centres are cheating. This technique of assessment in the Zimbabwe Junior Certificate has been suspended in some subjects with effect from 1989. Assessment would be theory examinations and one-off practical end of course examinations. In the "new" event some officers suggested the distribution should be as 60% theory and 40% for the practical examinations.

4.2 Discussion of theoretical framework and results

Assessment in education has, as already stated two main functions, the educational and societal. These functions interfere with each other. The demands of society usually have the greatest influence in the way assessment is handled. National examination must satisfy public expectations and in this way put pressure on the ways subjects are taught and evaluated.

The findings of this study indicate that teachers teach very much with national examinations as a point of reference. Kempa, (1986) observed the same,

> The demands of these examinations laid down in the examination syllabuses published by the examination boards, effectively define the content of the course offered by the schools and also have a significant influence on the teaching style and strategies employed by the teachers.
> (Kempa, 1986. p. 5)

The teachers model their assessment on what the examinations are looking for, freedom to use appropriate methods of instructions are hampered. This is not hard to understand, schools fight very hard to get as many and high passes as possible. For the student a good certificate is a bright promise. Thus the public demands on examinations are predominant. There is a danger that teaching in schools will be a drill for examination. Examinations or rather the way the examination results are used "sabotage" the teaching and learning situation. But examinations are still an integral and important part of education and cannot be done away with. Examinations are part of evaluation and a means of getting feedback which is so necessary in assessment.

The findings of this study indicate that examiners and teachers tend to mark pupils' practical work as one "whole", that is as one finished project. When coursework tasks are marked the tendency is to mark them as individual

wholes, mini-examinations. The so-called marking schemes are breakdowns of finished wholes. Other very important aspects of the skills are ignored, for example, how the student recognises and formulates the problem, designing and planning, setting up and execution of task, observation and measuring and finally the interpretation and evaluation of work produced. These have been ignored by examinations because examinations are so pressed for time and space, examination usually require the product only. If evaluation is to be thorough then all the aspects of the students' abilities must be accounted for *'in their current ecology'* (Salvia and Ysseldyke, 1978. p. 4). Kempa (1979) quoting himself in Kempa (1986) puts the case like this,

> The conclusion to be drawn ... we cannot simply infer a student's practical competence from the outcome of *one-off* practical examination. Likewise, 'good results' obtained in practical examination are in themselves not necessarily indicative of good practical skills. (Italics added) (Kempa, 1986, p. 73)

Kerr (1964) proposed the use of teacher-based assessment of practical work as a means of counteracting the undue influence of these external examinations.

Continuous assessment can have a chance of assessing most the students' performances. See *'Alternative approach to assessment in technical/practical subjects'* figure 4. Practical abilities would be progressively assessed as the course continues. To standardise the assessment, the tasks are provided by the examination board to all schools and randomly checked. The tasks would have comprehensive marking schemes, which include all aspects involved in practical abilities, or in the form of a profile or check list. Objectives and task analysis by Bloom & his co-workers (1971), Baldwin (1971) and Kempa's (1986) breakdown of practical abilities, Table 2 and 3 are examples that can help improve the general qualities in assessment.

During the coursework assessment the student is required to give his own independent appraisal of his abilities. The students' own evaluation may not be used in the final grading but is important from the educational point of view. The students' own evaluation helps to develop the 'inner' learning process of self-appraisal and creates a competent student.

From the study it is clear that practical abilities in schools in Zimbabwe, are evaluated in examinations and from coursework. There are no reported problems with the examinations but some problems of reliability and genuineness of the coursework marks presented by the secondary school teachers have been reported. A number of factors have been suggested as the cause of the problems.

The quality of the "emerging" schools, the so-called "Upper Tops" is said to be one cause. Some of these schools have little experience of examinations and tend not to take examinations seriously and there is a general lack of responsibility by the staff. The untrained and inexperienced secondary school teachers

are mostly found in these schools. Very few untrained teachers were found in the sample. There could be many other factors related to the responsibility question, perhaps lack of supervision and commitment of schools and teachers. These speculations would need a study.

One other factor related to the problem of coursework assessment was the teacher-pupil ratio. This study shows class sizes of an average of 30 pupils. This is too big for technical/practical subjects and teachers have to struggle to ensure learning in this situation. The case is made worse by the teaching load of 30 periods per week.There seem to be no alternative so teachers have to do the best can. Minister of Primary and Secondary Education, Fay Chung said 'We all have to sacrifice' (The Herald, 31 January 1989. p. 1).

The other more technical and logistical problems of coursework assessment were, lack of standardised conditions. The absence standardised assessment resulted in marks ranging too high or too low. At worse marks were faked. This study shows that almost half of the teachers had no training in marking practical abilities. The examiners of technical/practical subjects have the advantage of training in marking. Documents reviewed indicated that no standardisation was done for coursework assessment. Lack of funding inhibited the provision of monitors and moderators to check the coursework activities.The teachers who faked marks are of course at fault but the whole climate of chasing high marks certainly put pressure on untrained and inexperienced teachers.

The problems defined above led to a suspension of coursework assessment in some technical/practical subjects in the Zimbabwe Junior Certificate examinations. This is a great loss. Coursework assessment is very important in the assessment of practical abilities. Examinations alone cannot adequately cover all the important practical abilities that need to be assessed in these subjects(Kempa 1979).

Provision of funds for monitoring the coursework assessment, standardisation and moderation would be necessary to ensure smooth running of the scheme.There is a huge need for a reduction of class sizes in the schools. Supervision of the problem schools and training the teachers should ensure a return to the so necessary coursework assessment approach. A vigorous investigation of these related factors is urgent.

4.3 Credibility and implication of the study

The study has described approaches and techniques used in the assessment of practical abilities in technical/practical subjects in Zimbabwe. One limitation of the study was a general lack of literature on assessment and evaluation in technical/practical subjects. The study has indentified the advantages and disadvantages of various approaches and techniques.

The issues raised here could contribute to decision making on assessment in technical/practical subjects. The findings of this study and the discussion can be helpful in improving teaching and evaluation of technical/practical subjects in secondary schools in the light of the changes that are taking place in assessment and examination procedures in Zimbabwe.

Some of the factors affecting assessment are not so much 'educational' but public pressure to produce passes. Educationists have a responsibility to the public of course, but they must firmly resist these pressures which are not conducive to a proper education.

The main weakness of the study is the limited generalisability of the findings when one considers how the subjects were chosen.The research design and economic issues governed the selection of the sample. Observation could have been more helpful in establishing such variables as relationships between what happened in schools and examinations, and how assessment was done in both cases. Time and economy did not allow for this. The period for data collection was a rather busy one for schools, but author managed to get a healthy rate of response.

A number of questions still need to be studied. These include establishment of factors related to the abuse of coursework assessment in technical/practical subjects. Another area could be an indepth study of continuous assessment as the sole means of assessment of practical abilities in technical/practical subjects.

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APPENDIX A 1

QUESTIONNAIRE ON ASSESSMENT OF PUPILS' PRACTICAL WORK IN TECHNICAL SUBJECTS IN SECONDARY SCHOOLS

Dear Colleagues

This study concerns the assessment of pupils' practical work in technical subjects in secondary schools. There exists problems in the approach and inversely objectivity in assessment of pupils' outcomes in practical work. The investigation findings will help to identify and highlight the problems and then attempt at how it is possible to assess and/or evaluate pupils' outcomes in technical subjects.

Your personal contribution is very important in this pursuit of the development of assessment approaches in technical subjects. Please fill in the questionnaire as truthfully as possible and do not hesitate to give any other information you may consider relevant. When completed please return the questionnaire to the address below:

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Department of Curriculum Studies
Technical Subjects
P Bag MP 167
Mt PLEASENT

The findings will be used for an M A dissertation
by Nakai Nelson Chinyamunzore.
Supervisor: Associate Professor Thord Erasmie
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FORM NO_____

Name of school_____

Region_____

Teacher's name_____

Sex: male _____ female ____ *(tick)*

Teacher trained? YES____ NO____ *(tick)*

Teaching experience (No. of years)_____

in technical subjects_____

Technical subject/s taught_____

Classes/Forms_____

Form sizes_____

Class abilities: Mixed ____ Fast ____ Slow_____*(tick)*

Teaching load per week: 15 - 20____ 20 - 30_____ 30 +____*(tick)*

Any formal training in marking practical work? YES_____*(tick)*
NO_____

if 'yes' name the place_____

UNDERLINE THE CHOSEN ALTERNATIVE

1. How often do you use a marking scheme for marking everyday exercises.

   not at all. not often . often . almost always. always.

2. I always model my marking with the way examinations are done.

   not at all. not often . often. almost always. always.

3. The best pupil's work is used as reference for the class

   not often. often always.

4. Pupils' work is marked as groups_____

   in individually_____ or

   both_____

5. Pupils' sometimes mark their own work: yes____ no____

   personal projects_____

   exchanged projects_____

6. Record of pupils' every day performance is recorded as one score per project:

   YES ____ NO ___

if no please specify_____

7. When marking pupils' practical work I use written down specific objectives.

not at all. not often. often. almost always. always.

8. When doing the actual marking I stick to the written objectives.

not often. often. always.

9. Practical examination assessment should be done as end-year final examination

agreed. not agreed. indifferent.

10. Practical work assessment for examination purposes should be by continuous assessment or course work.

agreed. not agreed. indifferent.

11. The present approach to assessment of pupils' practical work is adequate.

agreed. not agreed. indifferent.

12. At the beginning of the course pupils are told of the assessment procedures of their work.

not often. often . always.

13. Mid-year examinations in technical subjects in the school are done the same way as the end of year examinations, ie, as theory paper and a practical examination.

not often. often. always.

14. The practical examination in Mid-year examinations is as one-set piece of work and the marks got are used as evaluation marks on report cards.

agreed. not agreed.

15. Do examination results relate or confirms what you have marked as the pupils' aptitude.

not often. always.

16. Course work projects are conducted as mini examination or with the same restrictions as in the final examination.

not often. often always.

17. What percentage would you give to course work as a part of the final examination assessment.

	tick
10% ------- 20%	_____
30% -------- 40%	_____
50% ------- 60%	_____
70% -------- 80%	_____
90% ------- 100%	_____

19. What are your reactions to the idea that pupil's own evaluation of his own work should be presented to contribute to his assessment?

20. What would you think of compiling a comprehensive report of the pupil's practical work progress as a means of obtaining the pupil's grade for assessment purposes.

21. Any other information.

APPENDIX B 1

INTERVIEW SCHEDULE ON THE ASSESSMENT OF PUPILS' PRACTICAL WORK IN TECHNICAL SUBJECTS IN SECONDARY SCHOOLS

EDUCATION OFFICERS & HEADMASTERS

1. What do you think are the reasons for having three examination papers in technical subjects, ie,
   (a) coursework paper
   (b) theory paper
   (c) practical paper, eg, Building at ZJC?

2. Do you, in your opinion, find the teachers' coursework marks realistic and valid?

3. Do you have an idea of how coursework exercises are done in the schools, that is,
   - with examination conditions or
   - with the teachers' assistance?

4. What support is being given to teachers in schools to update and refresh their marking abilities of practical work?
   -Is the marking of national examination an advantage?

5. Do you believe the present coursework percentage range to be adequate for the assessment of practical work and why?
   - suppose coursework carries more weight or
   - suppose no examination but only coursework are used for assessment of pupils" practical outcomes?

6. What is your reaction to the idea that pupil's evaluation of his own work be presented to contribute to his assessment?

7. Some institutions and schools, eg, in UK have/are adopting the use of profiles of pupils' progress in trade skills training and these are presented as a means of assessment, do you find this practicable in our present situation?

8. Practical work examination are usually one-off and done in, say, four hours,
   - do you find the measure obtained from the pupils' work a true representation of the pupils' abilities?
   - if not what steps are being taken to correct this?

9. What are the future plans, if any, of examinations or assessment of pupils' work in general in technical subjects?

10. Any other information?

DATA COMPUTED FROM THE QUESTIONNAIRES

	School	Region	Name	Sex	Trained	Experience ge...
1	A	Mash....	A1	male	yes	7
2	A	Mash....	A2	female	yes	1
3	B	Mash....	B1	male	yes	6
4	C	Mash....	C1	male	yes	2
5	C	Mash....	C2	male	yes	8
6	C	Mash....	C3	male	yes	2
7	D	Mash....	D1	female	no	1
8	D	Mash....	D2	female	yes	13
9	E	Mash....	E1	male	no	1
10	E	Mash....	E1	female	no	1
11	F	Mash....	F1	female	yes	8
12	F	Mash....	F2	female	yes	7
13	F	Mash....	F3	female	yes	2
14	F	Mash....	F4	male	yes	8
15	F	Mash....	F5	male	yes	2
16	F	Mash....	F6	male	yes	2
17	F	Mash....	F7	male	yes	3
18	G	Mash....	G1	female	no	1
19	G	Mash....	G2	female	yes	9
20	G	Mash....	G3	female	yes	9
21	G	Mash....	G4	male	yes	1
22	G	Mash....	G5	male	yes	2
23	H	Mash....	H1	male	no	1
24	H	Mash....	H2	female	yes	4
25	H	Mash....	H3	female	yes	1
26	H	Mash....	H4	female	yes	2
27	H	Mash....	H5	male	yes	8
28	H	Mash....	H5	female	yes	7
29	H	Mash....	H7	female	yes	3
30	I	Mash....	I1	male	yes	2
31	I	Mash....	I2	male	no	2

	Experience techn	Technical sub...	Classes	Form sizes	Abilities
1	7	ww	f2	20	mixed
2	1	he	f3	30	mixed
3	1	agric	f2	27	mixed
4	1	td	f3	50	mixed
5	8	bldg	f3	39	mixed
6	2	bldg	f2	25	mixed
7	1	he	f2	15	mixed
8	3	agric	f4	30	mixed
9	1	agric	f2	27	mixed
10	1	he	f2	38	mixed
11	8	he	f4	50	mixed
12	7	he	f4	18	mixed
13	•	td	f1	52	mixed
14	•	agric	f4	30	mixed
15	2	td	f4	19	mixed
16	2	agric	f3	40	mixed
17	3	agric	f3	50	mixed
18	1	he	f2	25	mixed
19	9	he	f4	25	mixed
20	9	he	f4	25	mixed
21	1	bldg	f3	30	mixed
22	2	bldg	f4	29	mixed
23	1	agric	f1	45	slow
24	1	ww	f2	25	mixed
25	1	ww	f1	25	mixed
26	1	he	f1	30	slow
27	8	agric	f2	25	mixed
28	7	he	f4	20	mixed
29	2	he	f1	20	mixed
30	2	td	f2	25	mixed
31	2	td	f1	25	mixed

	Teach load	Marking training	Name of the...	Q1	Q2	Q3	Q4	Q5
1	30	yes	G	r5	r5	r2	in...	no
2	30	yes	G	r5	r3	r2	both	no
3	30	no	-	r2	r4	r1	in...	no
4	50	yes	B	r3	r3	r3	both	yes
5	15	yes	D	r3	r3	r1	in...	no
6	30	no	-	r3	r3	r3	both	no
7	5	no		r1	r4	r1	in...	no
8	30	yes	G	r3	r4	r1	both	no
9	20	no	-	r2	r5	r2	gr...	no
10	20	no	-	r2	r5	r2	gr...	no
11	30	yes	G	r2	r3	r2	both	no
12	30	yes	G	r3	r3	r2	both	no
13	30	no	-	r4	r2	r1	in...	no
14	30	yes	B	r2	r3	r2	in...	no
15	20	yes	BH	r4	r4	r2	•	no
16	30	yes	B	r4	r4	r3	in...	no
17	30	yes	B	r4	r5	r2	both	no
18	30	no	-	r2	r2	•	gr...	yes
19	30	yes	H	r4	r5	r2	in...	yes
20	30	yes	H	r3	r3	r2	in...	no
21	30	yes	B	r5	r5	r3	both	no
22	30	yes	H	r4	r4	r3	in...	no
23	20	no	-	r2	r5	r3	in...	yes
24	20	no	-	r5	r5	r2	gr...	yes
25	30	no	-	r4	r5	r1	in...	no
26	20	no	-	r2	r3	r3	both	no
27	30	yes	G	r3	r5	r2	both	no
28	30	yes	H	r2	r3	r2	in...	no
29	30	no	-	r2	r1	r1	in...	no
30	30	no	-	r5	r4	r1	in...	no
31	30	no	-	r5	r4	r1	in...	no

* see decoded 'r' responses on appendix page C 5

	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17
1	no	r5	r3	r2	r2	r1	r3	r3	r2	r1	r1	r2
2	no	r5	r3	r2	r1	r2	r3	r3	r2	r1	r1	r4
3	yes	r5	r3	r2	r1	r2	r3	r1	r2	r2	r3	r3
4	yes	r5	r3	r1	r2	r1	r1	r1	r2	r2	r2	r2
5	yes	r5	r3	r1	r1	r1	r3	r2	r2	r2	r3	r3
6	yes	r5	r3	r2	r1	r2	r3	r3	r1	r1	r1	r3
7	yes	r5	r2	r2	r1	r1	r3	r1	r1	r1	r1	r2
8	no	r4	r2	r2	r1	r1	r3	r1	r1	r1	r2	r2
9	yes	r4	r3	r1	r1	r1	r1	r1	r1	r2	r3	r3
10	yes	r5	r3	r1	r1	r1	r1	r1	r1	r2	r2	r3
11	yes	r3	r2	r1	r2	r3	r2	r2	r1	r1	r2	•
12	yes	r5	r3	r2	r1	r1	r3	r3	r2	r1	r2	r2
13	yes	r4	r2	r1	r1	r1	r2	•	•	r1	r1	•
14	no	r5	r3	r2	r1	r1	r2	r1	r2	r1	r3	r1
15	yes	r3	r2	r2	r1	r2	r2	r2	r1	r1	r2	r2
16	yes	r5	r3	r2	r1	r2	r3	r3	r1	r2	r2	r4
17	yes	r5	r3	r1	r1	r2	r3	r1	r2	r2	r2	r3
18	•	r5	r3	r2	r2	r1	r3	r2	r1	r2	r3	r1
19	yes	r5	r3	r2	r1	r3	r2	r3	r1	r1	r1	r2
20	yes	r3	r2	r1	r3	r1	r1	r3	r1	r1	r2	r3
21	no	r5	r3	r1	r1	r2	r3	r3	r1	r1	r3	r2
22	yes	r3	r1	r1	r1	r2	r2	r3	r1	r1	r3	r4
23	yes	r5	r3	r1	•	r2	r3	r3	r1	r1	r3	r3
24	yes	r5	r3	r1	r1	r2	r3	r3	r1	r2	r3	r1
25	yes	r3	r1	r1	r1	r2	r3	r1	r1	r2	r3	r4
26	yes	r5	r1	r2	r1	r1	r3	r2	r1	r1	r2	r2
27	no	r5	r3	r1	r1	r1	r3	r3	r1	r1	r3	r4
28	yes	r5	r3	r2	r1	r2	r2	r2	r1	r1	r2	r1
29	yes	r3	r3	r1	r1	r1	r2	r3	r1	r2	•	r3
30	yes	r5	r2	r3	r1	r3	r3	r3	r2	r1	r3	r2
31	yes	r5	r2	r3	r1	r3	r3	r3	r2	r1	r3	r2

*

* see decoded 'r' responses on appendix page C 5

Code of 'r' responses
Q1: 1 not at all. 2 not often. 3 often. 4 almost always. 5 always.
Q2: 1 not at all. 2 not often. 3 often. 4 almost always. 5 always.
Q3: 1 not often. 2 often. 3 always.
Q7: 1 not at all. 2 not often. 3 often. 4 almost always. 5 always.
Q8: 1 not often. 2 often. 3 always.
Q9: 1 agreed. 2 not agreed. 3 indifferent.
Q10: 1 agreed. 2 not agreed. 3 indifferent.
Q11: 1 agreed. 2 not agreed. 3 indifferent.
Q12: 1 not often. 2 often. 3 always.
Q13: 1 not often. 2 often. 3 always.
Q14: 1 agreed. 2 not agreed.
Q15: 1 not often. 2 always.
Q16: 1not often. 2 often. 3 always.
Q17: 1 10-20. 2 30-40. 3 50-60. 4 70-80. 5 90-100.